Attachment C

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	**CC Docket No. 01-339,**
Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers	)	**No. 96-98 & No. 98-147**

DECLARATION OF IRWIN GERSZBERG ON BEHALF OF AT&T CORP.

I. BACKGROUND

1. My name is Irwin Gerszberg. I am a Division Manager in the Advanced Local Network Access Technology Organization for AT&T Local Services in Florham Park, NJ. The organization that I lead is responsible for all "Last Mile" Access Technologies for the AT&T Local Services Network. Accordingly, I have a detailed understanding of the architecture, facilities and equipment used in local networks.

2. I received a Bachelor's degree in Electrical Engineering from the New Jersey Institute of Technology and a Master's degree in Computer Science from Stevens Institute of Technology. I joined the Bell System in 1978. While at Bell Laboratories, I managed large software projects for the Regional Bell Operating Companies ("RBOCs") in advanced operations and testing of the local exchange network. In 1985, I led one of AT&T's first Speech Response/Voice Recognition Trials with the RBOCs. In 1989, I joined AT&T's Wireless unit, where I was responsible for the development of numerous advanced wireless technology services.

3. Since that time, through a variety of positions, I have explored network architectures that encourage the development of high-speed broadband technology into homes and businesses – *i.e.*, services based upon DSL transmission technology. In particular, I created many of the applications and devices used to provide high-speed services that are DSL-based. My inventions include, for example, a version of an Integrated Access Device that allows service providers to deliver multiple services (*e.g.*, high-speed data, packet voice lines, video) over a single twisted pair (Patent No. US6359881). I hold patents for other inventions that permit customers to easily perform multiple-line voice and data installations and integrate their communications devices with wireless technology.

4. I hold 65 Patents on local access technologies covering DSL, Voice over DSL, IP Cable telephony, Broadband Wireless and a vast array of emerging broadband infrastructure and services. For instance, another of my inventions specifies a technique to dynamically allocate and actively manage available bandwidth to voice and high-speed data services over twisted pair (Patent No. US6307839). I am a member of the New Jersey Technology Counsel, the Association of Public-Safety Communication Officials, the Society of Cable Telecommunications Engineers, and the Institute of Electrical and Electronic Engineers. As a result of my work, I earned AT&T's Science and Technology Medal in 2001. In addition, in February 2002, I was named "New Jersey Inventor of the Year" by the State of New Jersey and inducted into the New Jersey Inventors' Hall of Congress for my contributions to science and technology in the telecommunications industry.

II. SUMMARY AND INTRODUCTION

5. The purpose of my declaration is to describe a means by which customers obtaining local telecommunications services via traditional voice-grade loops may switch carriers using an electronic process. Copper loops generally are "hard-wired" to the incumbent

local exchange carrier's ("ILECs") facilities and switch, although the precise method of the hard-wired connection can vary depending on the network architecture employed by the ILEC. When a customer seeks to change to another local carrier that uses its own switch, ILEC technicians typically must remove the existing hard-wired connection and then install a new connection to equipment connected to the new local carrier's switch.

6. From an engineering standpoint, it would be far preferable to avoid the often significant manual work associated with changing the hard-wired connections. Ideally, customers should be able to change local carriers using a fully mechanized and integrated process, specifically a software-controlled process that relies upon software-defined links – like the process used for customers changing their long distance provider. At AT&T's request, I have investigated a way in which ILECs and competing carriers could deploy new equipment that would permit such an electronic process to be used for the copper loops that serve most customers. Under this solution, which AT&T refers to as "electronic loop provisioning," or ELP, many network facilities, including the existing loop distribution facilities and customer premises equipment, are unchanged. What is changed – or, more precisely, upgraded – is the transmission equipment that connects a customer's loop to its local carrier's switch. Critically, it is this upgrade to the transmission equipment that allows customers to switch local providers using a software-controlled process.

7. ELP deploys equipment that converts all of the customer's telecommunications services – both data and voice – into packets of data. "Packetizing" data communications is already commonly performed when a customer purchases DSL-based service. There, the local service provider deploys equipment that packetizes only the portion of the communications that use the high frequency spectrum ("HFS") of the loop. However, the decision to packetize only

this portion of the communications is not dictated by any technical concerns. In fact, under ELP, this same concept would be extended to all communications, including voice communications that generally occupy the low frequency spectrum ("LFS") portion of the loop. This modest change is nonetheless fundamental, because it allows the customer to change local carriers electronically.

8. ELP can be deployed today using equipment that vendors are currently offering. Indeed, customers with DSL-based services already use modems that include much of the technology that also would be used with ELP. Thus, ELP relies on much of the existing local network facilities, but deploys upgraded and/or additional equipment that provides the ability to change carriers electronically. In fact, in order to improve the efficiencies and capabilities of their networks, incumbent carriers today are already deploying equipment and facilities similar to or the same as what would be deployed under ELP – *i.e.*, digital loop carriers, ATM modules, and fiber transport facilities. However, the incumbent carriers currently deploy this technology in a manner that benefits only their own service offerings, and that in fact significantly hinders the efforts of competing carriers to provide service. The ELP architecture, by contrast, deploys this type of equipment in a manner that permits all carriers, including the incumbent, to have an equal opportunity to readily access a customer's loop using an electronic process.

9. ELP therefore has significant benefits for competition, but it is also superior from an engineering and operational perspective. Most notably, it eliminates the need for manual "hot cuts" on the customer's facilities to break the existing hard-wired connection – a process that is inefficient, unreliable, and prone to error. The ELP architecture also promotes advanced services such as xDSL high-speed data, can provide additional voice lines using the same loop for all services, and can be engineered in a manner (if so desired) to increase network reliability.

III. <u>ELECTRONIC LOOP PROVISIONING BUILDS ON THE EXISTING NETWORK AND COULD BE IMPLEMENTED TODAY USING READILY AVAILABLE TECHNOLOGY</u>

A. <u>For A Customer To Change Local Service Providers, The ILECs' Current Network Architecture Requires Manual Changes To The Facilities Serving The Customer</u>

10. Before explaining how ELP can be implemented, it is important to understand how local service is typically provided to customers served with voice-grade loops. In some cases, copper facilities are used all the way from the customer premises to the incumbent LEC's central office, the building where end-users' loops are joined to switching equipment. In this instance, the copper loops are hard-wired to a Main Distribution Frame, ("MDF"), and are then "cross-connected" using another copper wire (or "jumper") to a hard-wired connection on the other side of the MDF. The other hard-wired connection is then connected to the ILEC switch.

11. When a customer that is served by a voice-grade loop changes its existing local service to a switch-based competitor of the ILEC, an ILEC technician must generally perform a "coordinated hot cut." This intensely manual process requires the technician to remove the existing cross-connect, and then install a new cross-connect so that the customer's loop is terminated on equipment located in the competitor's collocation cage, rather than the ILEC switch. I am aware that AT&T has had significant problems in using hot cuts to serve customers. While the details of those problems are fully described in other portions of AT&T's filing, the critical fact for the purpose of my declaration is that when a customer seeks to change its local service from the incumbent LEC to another local carrier that uses its own switch, significant manual work is required on the loop facilities that serve that customer. As a general rule, when compared to software-controlled processes, manual work is costly, slow, and more prone to error.

12. Increasingly, the incumbent carriers have deployed digital loop carriers ("DLCs"), which are pieces of equipment that are often located remotely from the central office and closer to the customer premises. The DLC and associated equipment takes the communications coming over the copper loops and converts the signal into a digital format, so that communications can be transported more efficiently to the central office.

13. In a standard configuration for DLC existing today, a copper loop runs directly from the customer's premises to a serving area interface ("SAI"). This portion of the loop is known as the distribution plant. The SAI is a point where the copper distribution "sub-loop" from a number of customers terminate. Typically, the loops are cross-connected to additional copper facilities that connects the SAI to a remote terminal ("RT"). RTs are enclosures often located in the ILEC's outside plant – i.e., closer to the customers' premises. The remote terminal typically houses the DLC and other equipment that converts the analog voice communication into a digital format.[1] At that juncture, all the communications from the loops on the DLC are multiplexed together (to efficiently utilize costly transmission facilities) and transmitted through facilities (either fiber or copper wire) commonly known as the feeder plant of the local loop. The traffic carried over the feeder plant is terminated directly onto the ILEC's local circuit switch, and is not demultiplexed. Accordingly, in a DLC architecture, an individual customer's traffic arrives at the central office commingled with other customers' traffic.

14. Because of this fact, where DLC architecture is employed, it is even more difficult to switch a customer's voice-grade loop to a competing carrier's facilities. To serve a

[1] It is important to note that when the copper loops are sufficiently short, DLC equipment can just as easily be deployed in the central office, rather than a remote terminal. Indeed, this is precisely what a competing carrier must do in order to access a voice-grade loop via a hot cut. The competing carrier places DLC equipment into collocation that digitizes and multiplexes the voice-grade loops for backhaul to its switch.

customer whose loop is connected to a DLC, the incumbent carrier must be able to separate the traffic from a particular customer from the traffic of other customers that is commingled on the feeder facility. Unfortunately, the available processes for removing the customer's loop from the DLC can be even more cumbersome than when a main frame termination exists. Such methods can be time consuming, entail significant costs that the incumbent may seek to impose on the new carrier, and may also cause the customer to receive a degraded level of service.

15. A common method for a competing carrier to serve a customer who has a DLC loop is to remove the customer's loop from the DLC and place it back onto an older copper loop that extends from the customer's premises to the central office. However, this method presents a number of difficulties. First, the process of transferring the DLC loop to a copper "spare" loop requires an additional set of manual processes – in addition to the hot cut that I described above. Second, any spare copper loop has necessarily been placed out of service by the ILEC, frequently because they offer customers inferior quality to the digital service provided over DLC. Third, where DLC has been employed from the outset, as frequently occurs in newly constructed areas, there may simply be no spare copper loop at all. Fourth, a spare copper loop necessarily has a longer length of copper than a DLC loop, and reverting to the spare loop lowers the available bandwidth on the loop compared to the DLC loop and necessarily results in a lower grade of service capability.

16. Other methods for removing a loop from a DLC so that it can be made available to a competitor are equally flawed. For example, the ILEC could install demultiplexing equipment before the feeder facility terminates into the ILEC circuit switch. That would demultiplex *all* of the traffic from a DLC-fed feeder and re-convert the traffic from a digital to an analog format. The particular loop used to serve the customer won by the competing carrier

would then be separated through the hot cut procedure from the other loops and then connected to the carrier's facilities in collocated space. At that juncture, the competitor would *again* convert the analog signal on that loop to digital format and transport it over a DLC to its switch. It is obviously inefficient to perform all of the conversions needed to enable a competitor to obtain access to individual loops, and the cost of the additional conversions may make it prohibitively expensive to provide service.

17. Thus, regardless of whether a voice-grade loop is connected to a DLC or terminates directly to the ILEC central office, customers that wish to change to a local carrier that uses its own switch must endure a difficult process that necessarily requires extensive manual work to the customer's existing facilities and that often results in more expensive and/or lower quality service.

B. ELP Architecture Would Permit Customers To Change Local Service Providers Electronically

18. Unlike the current local network architecture, once the ELP architecture has been implemented and communications on both the HFS and LFS portion of the loop are packetized, customers could easily change local carriers electronically without any further changes to the underlying facilities serving the customer.

19. The ELP architecture transforms the loop connection between an end user and the customer's chosen local carrier from a hard-wired physical connection to one that is controlled by software. While the ELP architecture entails incremental investment to modernize the loop plant, it leverages existing investments already made by incumbent LECs and competitive local carriers. Notably, ELP functions with existing copper distribution loop plant and with existing circuit switches. In addition, customers generally will retain their existing customer premises equipment, inside wire, and network interface devices.

20. The transformation of the hard-wired connection to a software-controlled process is accomplished by techniques currently used in Asynchronous Transfer Mode (ATM) networks, a well-established technology that allows packets of data to be routed according to specified instructions. Specifically, communications on the HFS and LFS of the loop are broken into cells(which are the particular form of data packet employed in ATM technology), and each cell contains a "header" and other information that allows the transmission equipment to determine the physical facility over which the cells should be routed. The end result is a "permanent virtual circuit," which is not defined by a physical connection, but rather controlled by software.[2]

21. The changes in technology and equipment that would be necessary to implement the ELP architecture can be viewed in three segments. The first segment pertains to the changes that are needed in the incumbent LECs' outside loop plant – the portion of the network that is located outside of the central office up to the end-user premises. The second area where changes are needed is the incumbent LEC central office. The third set of changes relates to the equipment that would be used by all local carriers that elect to employ a traditional Class 5 circuit switched network to carry voice traffic under the ELP architecture. To illustrate the ELP

[2] The circuit is permanent in that it is a static, provisioned connection between two points (e.g. the customer's copper facility and the network of the competitive local service provider) that is established via software configurations and commands. PVCs are programmed and defined so that an end-user's traffic is always transmitted between the two particular points according to a pre-determined physical path. Unlike the existing local network architecture, which requires the use of cumbersome manual activities in order to re-wire an end-user to an alternative carrier, ATM technology inherent in ELP requires only that the virtual path be redefined by updates to ATM cell header information and ATM module routing tables. Each ATM cell contains two main components—a header and a payload. The header is comprised of several fields which, among other things, is used by ATM modules to route traffic. ATM cell header information and ATM module routing tables work in conjunction to determine whether a particular PVC (and its associated end-user traffic) should be transported from the end-user to the ILEC's network or to that of an alternative carrier. Any change to a customer's local carrier merely requires updates to the cell header address and ATM module routing tables — each of which can be achieved easily via the use of software. Simply put, ATM cells can be instructed by software to go from one point to another as desired—such electronic routing flexibility is the foundation of ELP.

architecture, I have included a diagram that demonstrates how and where this equipment would be placed in carriers' networks. *See* Figure 1.

1. The Incumbent LEC Outside Loop Plant

22. Under ELP, the key difference from the standard outside plant configuration described above is that transmission electronics in the RT, or DLC equipment, would be deployed or upgraded to digitize and packetize *all* communications traffic, not just the communications traffic in the HFS portion of the customers' loops, as is currently the case with ILECs' current DSL-based offerings. This packetization is performed by "true" Next Generation DLC ("tNGDLC") equipment that includes a functionality commonly known as a voice cell processor. Where the ILEC has already deployed a DLC, then that equipment would be upgraded to the tNGDLC. Where the customer loops terminate at the ILEC central office, then the tNGDLC functionality will be deployed at the central office.

23. The tNGDLC and its associated voice cell processor perform the critical function of digitizing and converting the voice signals into cells (or, for terminating calls, from cells into a bit stream and then an analog voice signal).[3] Specifically, the tNGDLC equipment and the voice cell processors take the customers' telecommunications traffic – both voice and data – and convert it into the ATM packet format. For traffic originated by the customer, the tNGDLC electronics convert all communications into ATM cells and manage the transfer of these cells over transport facilities (generally fiber). Conversely, for traffic that is to be terminated to a

[3] Critically, however, this is not a "new" technology. Rather, it is the natural evolution of digital transmission technology, that has existed for many years. In the 1970s the traditional loop architecture of copper pairs was supplemented by the introduction of DLC with high-capacity fiber feeder. NGDLC simply permits improved signal discrimination and more efficient pair gain (multiplexing) so as to permit more data to transit a conductor per unit of time. Moreover, the introduction of NGDLC architecture does not create new services. Rather, the technology permits the ILECs to better employ the transmission capacity of existing facilities while also increasing their own economies in their loop plant.

customer, the traffic is routed in ATM cell form to the RT, where the tNGDLC will direct the cells to the appropriate line card on which the customer's line is terminated.[4] If a voice service is involved, the line card electronics will decompose the ATM packet cells into a binary stream (i.e., a continuous stream of digits where each grouping of eight digits represents a number) and then into analog format (where the preceding numbers represent a particular voltage level of the analog waveform to be generated). As a result, no changes need to be made to the traditional telephone sets that a customer is using and end-users can continue to use existing CPE for traditional voice service. At the same time, customers that want advanced services, such as additional derived voice lines, DSL-based services, and/or other high speed data services, would need to install compatible CPE and the appropriate line card electronics would be required in the DLC.[5] This is similar to the requirement that customers who today subscribe to DSL-based service must install a DSL modem on their computer.[6]

24. Once packetized by the tNGDLC equipment at the RT, all of a customer's telecommunications traffic is transported over a multiplexed facility, generally a high capacity fiber feeder facility, to the incumbent LEC central office. This is a significant improvement over the existing outside plant architecture that ILECs have traditionally deployed to support for DSL-

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[4] Although not necessary to implement ELP, additional efficiencies could be achieved if a remotely operated cross-connection device were deployed somewhere between the SAI and the RT. The cross-connection device would allow the carrier to change the line card that serves a customer remotely. As a consequence, a customer could switch to a service requiring a different type of line card – from plain voice service to DSL, for example -- without requiring a technician to visit the RT to manually switch the customer to a new line card.

[5] Specifically, such advanced services would require the deployment of a compatible Integrated Access Device (IAD) at the customer premises. An IAD is simply a device that supports voice, data, and video information streams over a single circuit.

[6] Significantly, however, ELP should *not* require customers who already have DSL-based services to replace their modems (which are simply a type of IAD).

based services. Under the ILECs' current NGDLC architectures, separate feeder facilities are required: an ATM facility to transport the HFS transmissions and a time-division multiplexed ("TDM") facility for the LFS transmissions. This is an inefficient and costly design, because two parallel facilities (each of which is typically backed-up with an alternative facility) are used to transport traffic between the very same points – the RT and the central office. By contrast, where *all* the traffic is packetized, as would occur with the ELP architecture, one common feeder facility can be used between the RT and the central office for all types of traffic.

2. The Incumbent LEC Central Office

25. Under the ELP architecture, the fiber facility that carries traffic from the RT would not connect directly to the ILEC circuit switch, as occurs today with copper loops. Instead, as with the HFS transmissions in the ILECs' NGDLC architecture, the feeder terminates at an ATM module. That module serves as a multiplexer that allows the RT electronics (and traffic from the customers' loops) to be shared among all local carriers' networks. ATM cells can carry any type of communications traffic, and ATM technology also permits strict enforcement of service quality levels that can vary by application.[7]

26. The ATM module serves as the point of demarcation between the incumbent LEC loop plant and the network of all local carriers, including the incumbent. The ATM module would also serve as the interconnection gateway for carriers to access the loops of retail customers. This is necessary because, as with "ordinary" NGDLC technology, the ATM module is the point at which all of the packetized communications converge for all the loops served by the feeder facility. Thus, the ATM module under the ELP architecture, as with any other multiplexer/demultiplexer, is necessary to sort out the commingled traffic carried by the feeder

[7] For example, an ATM can be configured to provide a higher priority to identified categories of cells (*e.g.*, for certain customers or for certain types of traffic).

facility and deliver it to the customer's chosen carrier, whether an ILEC or a competitor. Likewise, the ATM module must sort the cells received from various carriers so that they are "cross-connected" – by the software-controlled permanent virtual circuit – to the correct RT and customer facility. Indeed, without this sorting function, no carrier, including the incumbent, can identify its own customers' traffic for delivery to its network.

27. Each local carrier seeking to serve customers whose loops terminate at that central office, including the ILEC, would use appropriate facilities connected to the ATM module (e.g. Type I or Type II DS-1, DS-3, OC-3, etc. transport facilities) to transport its end-user traffic to its own network (e.g. circuit switched and/or packet networks based on the carrier and service being provided).[8] By connecting to the ATM module, any competing local carrier could readily access the facilities used to serve all end-users connected to the central offices where the ATM is located. All competing carriers, including the incumbent LEC, would be assigned one or more physical ports on the ATM module (e.g. DS-1, DS-3, OC-3, etc. ports), and the telecommunications traffic from their end-users would be identified by the ATM and directed to that port(s) for transport to the identified carrier's network based upon the permanent virtual circuit established for the customer-carrier combination.

28. The ATM module and the associated tNGDLC located at the RT allow a customer to switch local carriers electronically, with no manual or physical changes to the underlying facilities, because, as described earlier, the ATM technology inherent to ELP creates the permanent virtual circuit for each customer. As a consequence, if a customer wishes to change

[8] The incumbents' circuit switches would be located in the same central office, and their packet switches would likely be located there as well. Competitors' packet switches may be collocated in the same central office as the ATM, at a hub collocation or elsewhere. However, if a CLEC deploys a traditional circuit switch, the Commission's rules would not permit it to be placed in a collocation.

service providers, the ELP architecture allows that migration to occur entirely using software, with no need for a manual hot cut. A software command to the ATM module, and the associated tNGDLC electronics at the RT, allows the existing path to one carrier's network to be re-defined to a new carrier's network.

3. VoATM Gateways

29. In order for packetized voice communications traffic to be handled by traditional circuit switched voice networks, VoATM gateway equipment must be deployed by all local carriers that wish to serve customers under the ELP architecture using a traditional circuit switched network.

30. For transmissions from the circuit switched PSTN that will be terminated to the customer, the VoATM gateway converts TDM-based voice traffic to ATM cells. For telecommunications traffic originated by the customer towards the circuit switch network, the VoATM gateway processes the voice packets to meet the GR-303 or GR-8 protocol, which are interface requirements for connecting the local loop to a Class 5 switch. DLCs equipped with these interfaces are commonly found in local carriers' networks. Vendors of VoATM gateways utilize a GR-303 or GR-8 interface to preserve the carriers' investment in Class 5 switching equipment. The GR-303/GR-8-equipped gateway will allow service providers to deliver service to end users that utilize the full feature set of the Class 5 switch.

31. As a result, despite the modernization of the loop architecture, end-users will continue to have to all Class 5 switch features without any modification required of the Class 5 switch network, and the current investment in Class 5 switches can remain in place .

C. <u>The ELP Architecture Can Be Deployed Today</u>

32. Most significantly, the ELP architecture relies entirely on equipment that is readily available from vendors. The foundation for ELP architecture is the application of ATM

technology to the entirety of customers' traffic. ATM is a tried and tested technology that is already widely deployed. Moreover, all of the equipment that takes advantage of ATM technology and which represent the significant network elements of the ELP architecture – tNGDLC, ATM modules and VoATM gateways – are generally available today.

33. While it would take considerable effort to implement ELP technology simultaneously on a nationwide basis, the architecture permits a phased-in approach so that the necessary equipment could be deployed by ILECs in stages. This is also how long distance equal access technologies were deployed in the 1980s. See Attachment G to AT&T's Comments.

IV. ELP PROVIDES SIGNIFICANT ENGINEERING BENEFITS

34. The ELP architecture offers numerous benefits over the ILECs' current network. Most significantly, customers would be able to change local service providers electronically, and without any manual work on underlying facilities. While that of course provides enormous benefits for competition, as an engineer, I focus on the technical and operational benefits, which are also highly substantial.

35. First, from an engineering and operational standpoint, it is far preferable for competing carriers to be able to use software to access a customer's loop, rather than rely on manual work by technicians. The hot cut process requires significant manual processing, and introduces a number of points-of-failure of the sort that engineers strive to avoid when designing a network. Manual activity brings with it opportunity for human error, as well as increases in delay and cost, that generally can be avoided through automation.[9] By contrast, an electronic,

[9] Notably, an automated process reduces the need for technicians of competing carriers to work in and around the ILEC central office. As I understand it, several ILECs have recently flagged this issue as a security concern.

software-defined process for changing carriers is more reliable, offers improved functionality, and is more efficient – all attributes that are critical functions in a properly designed network.

36. Second, the ELP architecture uses much existing technology, while permitting customers to have better access to high speed or advanced services networks. ELP does not require carriers to forego serving such markets because of the impracticality of replacing or partially replicating the ILECs' loop plant. At the same time, from the ILECs' perspective, ELP uses the existing network interface devices, copper distribution, and existing fiber feeder.

37. Moreover, ELP enables carriers and customers to obtain the benefits of an advanced network that offers electronic access to loops and to customers. Customers seeking advanced services can use existing DSL technology with ELP architecture.[10] In addition, the approach has the potential to standardize a wireline broadband interface to customers, which, in turn, would almost certainly encourage new broadband applications and a proliferation of core advanced services networks. Customers that require only voice services may continue to use their existing equipment, but get the benefits of competition. The ELP architecture will allow delivery of voice services that are equivalent to the current ILEC voiceband services in terms of performance and reliability. From the perspective of the Class 5 switch, the ELP architecture presents an interface that is equivalent to GR-303/GR-8 technology in common usage today.

38. In addition, the ELP architecture, if so desired, can be engineered to account for other considerations such as increased network survivability in the face of network disasters — natural or other. For example a fiber feeder ring architecture could be implemented that would link sub-tending RTs (and their associated electronics, e.g. tNGDLCs) to one or more ILEC

[10] To do this, the customer would require the appropriate premises equipment and the incumbent would need to provide appropriate interfacing line card electronics in the DLC with those electronics being incremental costs not associated with POTS.

central offices, therefore mitigating the impact of a disaster upon end-users. Naturally, the benefits of such considerations must be placed in the context of the incremental investment that will be necessary to achieve them. Nonetheless, it is important to keep in mind that the ELP architecture is sufficiently flexible in design in order for such considerations to be accounted for in the architecture.

VERIFICATION PAGE

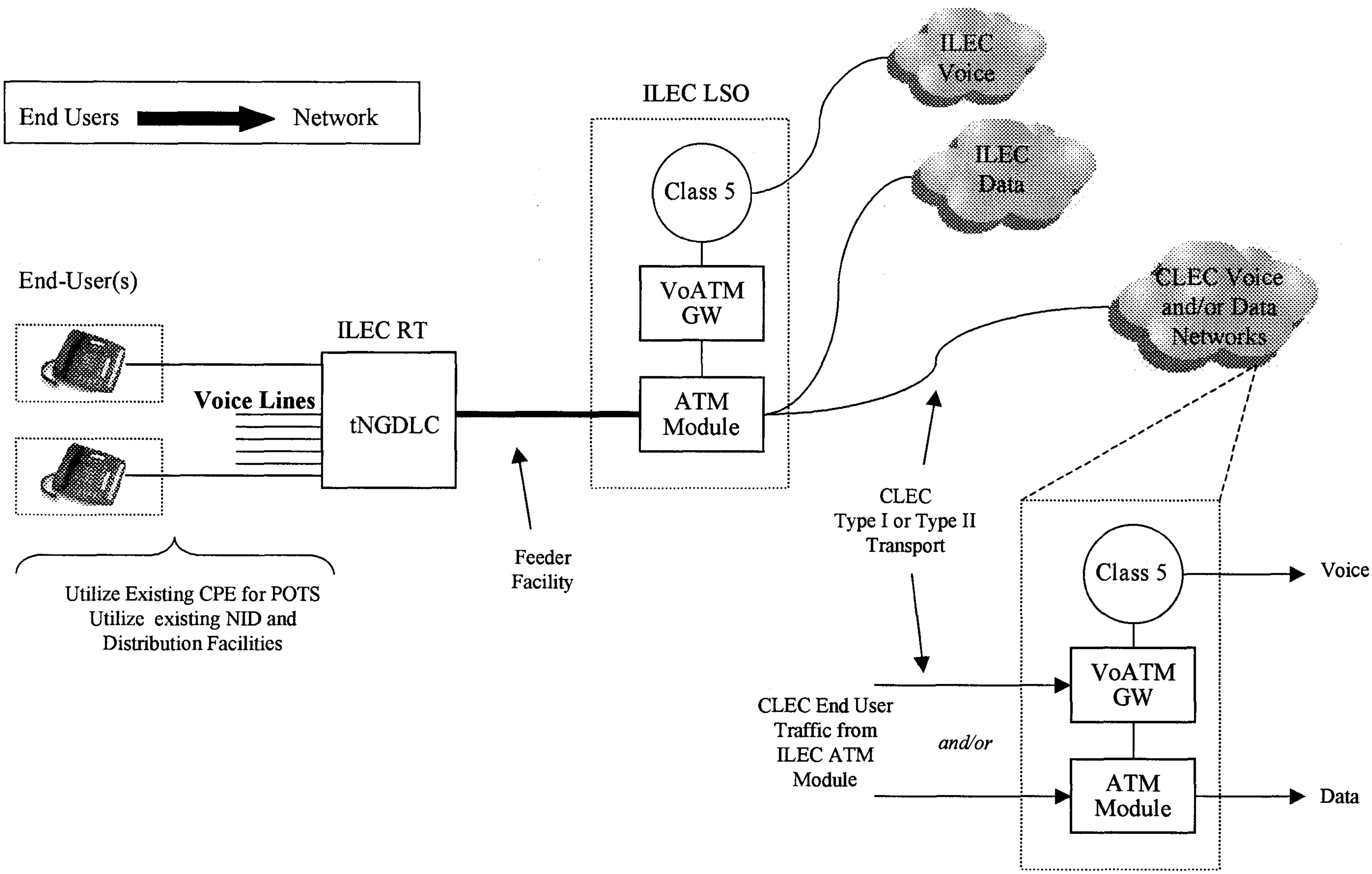
I hereby declare under penalty of perjury that the foregoing is true and accurate to the best of my knowledge and belief.

Irwin Gerszberg

April 4, 2002

Exhibit 1

General ELP Network Architecture Diagram



Note : The ELP architecture can be designed and engineered in several different ways. This is a general illustration of the ELP architecture / flow through.